EL2320 Applied Estimation 7.5 credits

Tillämpad estimering

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for EL2320 valid from Autumn 2010

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

For single course students: 120 credits and documented proficiency in English B or equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The overall goal of the course is to give the participants theoretical as well as practical skills and experience in estimation. The course will start from a number of concrete examples to motivate the need for various filtering techniques such as Kalman filters and particle filters.After completing the course the participants should:

- be able to analyse estimation problems and choose suitable techniques to solve them
- understand the theoretical basis for the estimation techniques
- use different estimation techniques such as Kalman filters and particle filters to solve real world problems

Course contents

The course focuses on giving the participants practical experience in using different estimation techniques on real problems. Examples used in the course are for example from navigation with mobile robots. The following will be covered in the course: Observability, the Markov assumption, data association, estimation techniques such as Kalman filter, extended Kalman filter, particle filter, Rao-Blackwellized particle filter, Unscented Kalman Filter, Covariance Intersection.

Disposition

There are 12 lectures and two projects in the course.

During the lectures both theory and practice of estimation will be covered. Getting practical skills in anything requires you to get hands-on experience and as such the work between the lectures will be very important.

Course literature

There is no official course book. Letcures notes will be made available. This course is at advanced level so some of the material will be in the form of reseach publication. The students are assumed able to research for additional material to solve the project assignment.

The recommended reading is "Probabilistic robotics" by Thrun, Burgard and Fox, The MIT Press, ISBN 0-262-20162-3 covers most of the material in the course from a robotics points of view.

Equipment

No special equipment needed, you only need access to a computer

Examination

- PRO2 - Project, 2.0 credits, grading scale: P, F
- PRO1 - Project, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 3.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

The basic part of the examination in the course consists of on regular exam and two iindivual lab like project assignments.

PRO1: 2.0hp
PRO2: 2.0hp
TEN: 3.5hp

Each of these will be reported to the system with a P/F grade and passing them means that the student has passed the course.

For higher grades the student need to select a topic to study in a more focused project, researching for material in the literature. This project assignment can be completed in groups of two students.

The final grade is given as A-F and is based on the performance on the exam and the project work. Completing only the two basic part of the project gives the grade E.

Other requirements for final grade

To get a passing grade in the course the students need to pass the mandatory part of the project assigments and the exam.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.